



An introduction to reproduction management of fibre and meat goats

Updated: January 2007

AG1003

ISSN 1329-8062

Bruce McGregor, Attwood

Introduction

This Agriculture Note provides practical information about managing breeding goats on commercial farms. It discusses management practices that affect reproductive performance, fertility and mating during autumn. Where possible, examples of reproductive performance from goats farmed in Victoria are provided. Other Agriculture Notes discuss the grazing requirements for breeding does, and the effects of feeding on growth and meat production.

Reproduction in goats

Age at sexual maturity

Generally, males and females should be separated before 16 weeks of age. It is possible for fertile matings to occur at ages between 4 and 6 months.

In Victoria, spring born kids can be sexually mature when they reached 40% of the mature body weight of their doe. As most mature does average about 45-50 kg live weight, well fed kids will be likely to reach sexual maturity in their first year when they reach 16 to 20 kg.

Breeding season

Goats are seasonal breeders as their reproductive cycle responds to changes in day length. Sexual activity is usually greatest during autumn and winter. It is possible to mate goats from late summer until late winter. Mating goats between August and November is more problematic but can occur in non-pregnant does.

The onset of the breeding season may vary depending on feed supply and climatic conditions. The onset of breeding in feral goats introduced to Victoria may be delayed by stresses such as change in environment, change in feed, transport, diseases and lower body condition.

Oestrus cycle and "heat"

Goats, like sheep and cattle, have an oestrus cycle. The oestrus cycle for goats is about 20 days, with a usual range of 18 to 22 days. Does ovulate at the end of the oestrus cycle. Does will continue to cycle until they become pregnant and will not cycle again until some time after kidding. Some does have short or very long oestrus cycles.

At the end of the oestrus cycle, does come into oestrus. Some farmers say their does are "in season" or "on heat". This period of heat usually lasts about 24 to 36 hours. Does will seek out and mate with bucks during heat.

Farmers can usually detect does in heat by the following signs: does seeking out bucks, wagging of the tail, mounting behaviour, bleating, clear mucous discharge from the vulva, reddening and swelling of the vulva. Sometimes on the first oestrus cycle of the year and often with young does, these behaviours are not so obvious.

Gestation period

The length of pregnancy is called the gestation period. For goats, the gestation period is about 149 days with a usual range of 145 to 153 days. Gestation may be shorter in twin bearing does and in extreme weather.

Boer goats

In South Africa, Boer goats can reach puberty at 6 months and at 18 kg body weight. The proportion of does exhibiting oestrus is low in spring and summer (Table 1) and reaches a peak in autumn.

Table 1. Oestrus periods recorded in Boer goat does, relative to possible periods per month (Hofmeyr et al. 1965 as cited by Naude and Hofmeyr 1981).

Month	%	Month	%	Month	%
January	33	May	63	September	40
February	30	June	59	October	48
March	52	July	56	November	16
April	52	August	71	December	44

Body weight at mating

The major factor influencing reproductive performance is the body weight of does at mating. Heavier does produce more kids than lighter does. This is a static response, heavier body weight gives higher ovulation rate.

Body weight change also influences reproductive performance. Does that are gaining weight at mating time will generally have a higher ovulation rate than goats losing weight. This is a dynamic response and is variable. These responses are shown in Figure 1. Real examples of reproduction responses are shown in Table 2 and Figure 2.

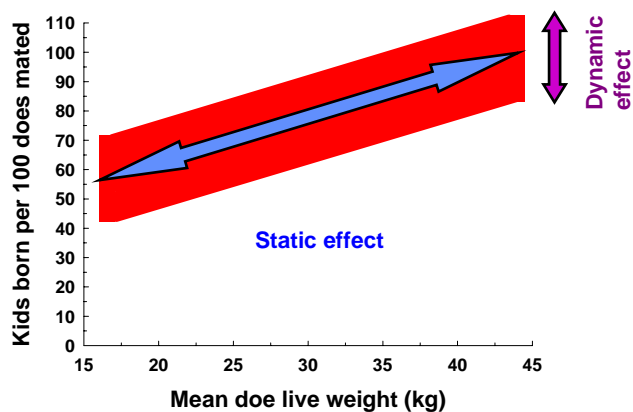


Figure 1. Diagram illustrating the potential static and dynamic effects of body weight on the reproductive performance of goats

Table 2 provides some reproductive performance of Angora goats. Table 2 shows that 36 to 45 kg does produced almost twice as many kids as does weighing less than 27 kg and 40% more kids than does weighing 27 to 32 kg. A similar picture is seen in the number of kids raised in the paddock, where heavier does wean many more kids than lighter does.

Table 2. Reproductive performance of Angora does at different body weights (USA data)

Doe body weight at mating (kg)	Kidding* %	Kids weaned# %
Below 27	76	59
27 - 32	102	62
32 - 36	117	81
36 - 41	143	115
41 - 45	147	117

* kids born and # kids reared per 100 does mated

The kidding performance of a flock of mixed age Australian cashmere goats grazed under commercial conditions (wheat sheep belt, annual rainfall 500 mm pa) is shown in Figure 2. These does were mated to 18 month old inexperienced bucks. The proportion of does which kidded increased from 56% for does less than 20 kg body weight to 84% for does greater than 44 kg body weight.

The number of kids born per doe kidding increased from 1 at doe body weights less than 20 kg, to an average of 1.5 at doe body weights greater than 40 kg.

This flock included old does, greater than 44 kg, that normally would be culled for age-related faults such as broken mouths and no kids. The lower value of kids born per 100 does mated, for these old does, shows what happens if these does with faults are not culled.

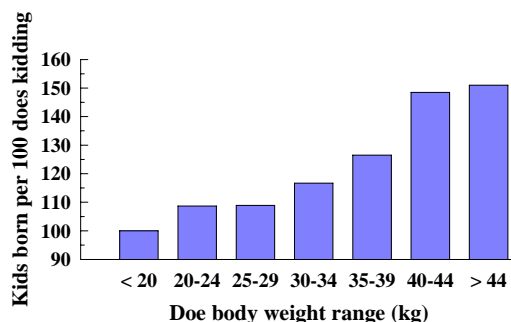
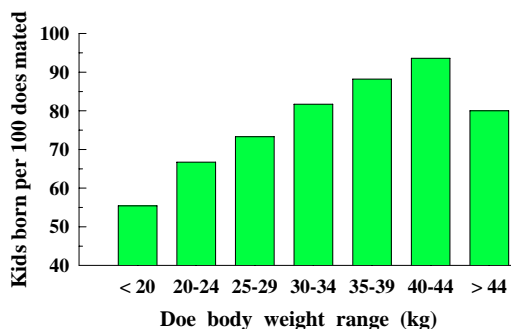


Figure 2. Body weight and kidding performance of Australian cashmere does managed under harsh commercial conditions

Should I mate my weaner does?

Many producers wish to mate their does at the earliest possible age. The earliest practical age is often about seven months. Mating at this age is not generally recommended as it can be costly. Mating at seven months of age is likely to reduce the lifetime kid production of the doe. Does at seven months of age may be sexually mature but their body weight and reserves of energy and protein are low.

Table 3 shows that the kidding performance of does under 25 kg is very poor during the first year, and that lifetime production is reduced by 10 to 40%. Up to 30% of does mated at an early age abort during the later part of pregnancy. Fortunately, many low body weight does do not conceive. Aborting young does waste energy and protein that they would have used for their own body growth if they had not been mated.

Table 3. The effect of mating kid does on their first kidding and on their life time kidding performance (USA data)

Kid doe body weight at mating (kg)	First kidding %	Average lifetime kidding %
Below 18	2	48
18 – 20	21	70
20 – 23	32	72
23 – 25	55	79
25 – 27	78	82
27 – 32	81	86
Above 32	88	89

The combined effects of pregnancy and lactation on the body development of young does may result in stunted growth. The end result of early mating is that you lose on the potential fertility in later life by trying to get a few more kids a year earlier.

It is possible to mate at seven months and get 100% kidding but excellent feeding and management are essential. Generally, it is advisable to wait until does are 19 months of age before mating.

Action if weaner does are mated they should weigh 25 kg or more. They must be given the best possible feeding during pregnancy and lactation. They will need energy supplements during late pregnancy and lactation.

How can I get heavier does?

To get heavier does at mating time:

- does must be grazed at the correct stocking rate;
- does must be fed properly during lactation;
- kids must be weaned at the correct time;
- if needed, energy supplements should be fed.

Graze at the correct stocking rate

Recommended stocking rates are based on non breeding wether sheep commonly called “dry sheep”. One dry sheep equivalent (DSE) is the feed required to maintain a 45 kg Merino wether for one year. The DSE of a breeding Merino ewe is about 30 to 50% more than that of a wether ie: 1 breeding Merino ewe = 1.3 DSE.

This means that the number of breeding Merino ewes that a farmer can safely graze is 30% less than the number of Merino wethers that can be grazed.

As breeding crossbred ewes are bigger sheep and more fertile than Merinos their DSE = 2.1 (when the lambs are sold at weaning).

What is the correct stocking rate for Angora does?

Mature Angora does can weigh up to 60 kg. The mean body weight of 3,000 Angora does in recent experiments in southern Australia was 45 kg. Angora does are shorn twice each year, thus increasing their exposure to cold stress compared to Merino sheep. Well managed does rear more offspring (100 to 120%) than Merino ewes (80%). The total energy requirement of Angora does are more than typical commercial Merino ewes.

The DSE rating of breeding Angora does is about 1.5 DSE plus 1.4 DSE per doe if kids are grazed until 19 months of age (mating age).

Consequences of grazing does above the recommended stocking rate

Research has shown that grazing goats above the recommended stocking rate will:

- reduce body weight;
- reduce body condition score and fat reserves;
- increase deaths from cold stress;

- increase internal parasitism during spring;
- reduce doe body weight which will reduce kidding performance the following year.

Grazing goats at high stocking rates is not the correct environment in which to breed kids. At high stocking rates, the potential kidding performance will be reduced as does will be lighter (up to 9 kg lighter at mating in February).

During winter, when the foetus should be developing rapidly, does graze under nutritional conditions that often prevent body weight gain. These conditions may increase the number of abortions and reduce kidding still further. Kids may also acquire heavy internal parasite burdens.

It is recommended that goats should not be grazed at intensities greater than 7.5 DSE/ha (3 DSE/acre) and any remaining grazing capacity be utilised by sheep or cattle.

Feed does correctly during lactation

If does are poorly fed during lactation they will lose body weight, weight that will be difficult to regain grazing dry pasture during summer. If does are well fed during lactation they can gain body weight during lactation.

Wean kids at the correct time

Wean last years' kids at least 2 months before mating. This will reduce any effects that lactation may have on reproductive performance. Most does have almost stopped lactating by 13 weeks after kidding, so the benefits to the kids of any milk produced at this stage are small.

Surplus kids being sold for capretto meat production should not be weaned prior to sale.

Buck kids should be weaned and separated from their mothers and sisters by the time they reach sexual maturity. Spring born Australian feral cashmere type buck kids reach sexual maturity at about 40% of their ultimate mature size (about 15 kg) but they may begin sexual behaviours at an earlier age. This means that sperm are present at this stage. The ability of cashmere type kid bucks to successfully mate increases at body weights greater than 15 kg.

Feed energy supplements if necessary

In Australian regions with annual pastures, pasture availability and quality is usually severely reduced by mid summer and autumn. On dry grazed annual pastures, goats can lose body weight at rates up to 1 kg per week. So over a period of 2 months does can lose 8 kg. If summer rainfall results in a green pick and in regions of Australia with reliable summer rainfall or on irrigated pastures, goats will maintain body weight or grow.

If necessary, supplementary feeding of energy during the six weeks before mating is necessary to ensure that does maintain body weight.

The best supplement in these summer drought conditions is energy, usually most economically provided by cereal grain. Cereal grain should be fed at the rate of 200 to 250 g per head per day. This ration will supply about half the

energy requirements of the does and in most situations will prevent body weight loss.

When feeding grain to does for periods of greater than two to three weeks add by weight:

- crushed limestone at the rate of 1.5%;
- common salt at the rate of 1%;
- mix all the additives in well with the grain.

For example: for 100 does fed 200 g of barley per head per day, each day you mix 20 kg barley, 300 g limestone and 200 g salt.

Choosing energy supplements and how to feed cereal grain is discussed in detail in the Agriculture Note on drought feeding of goats.

When is the best month to mate?

Goats can be naturally mated at most times of the year. In Australia, August to October is the most difficult period. Generally breeders mate their does from December to May. Natural fertility is highest in autumn (March to May). Some Angora does have been reported to be very seasonal breeders and only easy to mate during autumn.

Hormonal treatments can induce autumn fertility with matings as early as December (advantages over untreated does could be up to 30%).

When is the best time to kid?

Deciding which month to mate is usually based upon:

- trying to avoid the worst weather conditions for kidding;
- timing kidding so that does and kids can use the best pasture for rapid kid growth;
- minimising the risks from predators.

In annual pasture areas, kidding is usually preferred from May to July, while in perennial pasture areas, kidding is often planned for September to November. As kids are vulnerable to cold wet windy weather, it is best to avoid kidding in the worst months of winter. In much of Victoria, the weather conditions in late autumn and early winter are, on average, more stable than during July to October.

For a rule of thumb, the time from actual mating to kidding for goats is approximately 21 weeks.

Mate during the second oestrus cycle

Fertility of does is higher following mating at the second oestrus of the breeding season rather than the first or third oestrus. This is especially important for does mated early in the season. Research has shown that the ovulation rate of does in their second oestrus could be up to 15% higher than the ovulation rate of does in their first oestrus.

Action required to mate at the second oestrus is to expose does to a teaser buck for 7 to 14 days. This is then followed by the introduction of fertile bucks for the usual six to eight week mating period.

Consult with your local veterinarian about operating on surplus bucks to produce teasers (vasectomised or epididymectomised). The operation is quick and simple and must make the buck infertile. You must confirm that the bucks are infertile. The teaser bucks can be ready for use within several weeks. The use of teaser bucks is of great value as some does may not come into seasonal oestrus unless bucks are placed with does. Teasers can be any crossbred Angora, crossbred Boer or cashmere buck.

Action have your vet produce a group of teaser bucks during late spring. Keep them with the bucks and use them over several years.

Use the buck and doe effect to increase synchronisation of kidding

Does who are not in oestrus are responsive to the stimulus of active bucks (or teasers) and to does who are in oestrus.

To get the best response to the buck effect it is important to keep bucks and teasers away from the breeding doe flock. Ideally, bucks and teasers should be kept at least 300 m from the breeding doe flock and preferably further away during the 6 weeks prior to mating. When bucks or teasers are then introduced for mating, the breeding does will respond with a more uniform induction of oestrus.

Likewise, the introduction of does in oestrus to a flock of does not in oestrus will stimulate oestrus activity and provide some natural synchronisation of oestrus activity. Consult your vet regarding methods to produce “hot does”.

If does are synchronised, you may need to increase the number of bucks present during mating.

Managing bucks

Bucks can show sexual activity throughout the year but generally breeders only observe sexual activity in autumn. The number of successful matings by bucks is generally higher in the period January to July.

Bucks reach sexual maturity at about 40% of their ultimate mature size but they begin sexual behaviours at an earlier age. This means most bucks are fertile at about 16 kg body weight. It is usually best to grow bucks to about 19 months of age before using them in breeding programs. By this age you can more readily assess the bucks fleece quality and growth rate potential.

Buck health is important

Bucks must be in excellent condition at mating, otherwise mating performance and the subsequent kidding performance could be depressed. Bucks must be capable of serving at least ten does each day when introduced during the second oestrus cycle of the breeding season.

Action is required several months before the breeding season to ensure bucks have:

- plenty of feed;
- lots of cool clean water;
- adequate shade during summer and in the time leading up to mating. If this is not done, semen production

will be reduced and sperm numbers may be inadequate for fertilisation of more than a few does;

- their feet regularly trimmed and kept in good order. Bucks place great stress on their hind legs and feet during mounting. If they are in pain from bad feet, they will refuse to mate.

Bucks should also be inspected for damage to the testes and penis. The testes should be soft and spongy and free of lumps. Wounds, cuts or abscesses could also render a buck infertile. Bucks that have been housed and fed rations with high protein (nitrogen) levels and diets with poor mineral balance could develop urinary calculi and problems of the urinary tract. These problems have often been observed in show goats which have been "force fed" over summer.

Action ask your vet to undertake a fertility test and advise you on a buck's likely breeding ability. This is a useful test to undertake before purchasing bucks.

If purchasing a buck, ensure that both testicles have descended. The breeding potential and value of a buck is considerably reduced if it has only one descended testicle. This fault (cryptorchidism) can be passed to the next generation.

Using young bucks

Young inexperienced bucks need extra management to ensure that they get on with mating. Young bucks may wish to go walkabout and rejoin the buck flock again.

Action young bucks should be confined in yards or small secure paddocks with mature does in oestrus. Some practice with does in oestrus will help. When the young bucks show interest in mating and staying with the flock they can be put into larger paddocks used for mating.

How do I know if the bucks are working and the does are mated?

The best method of checking if bucks are working is to use mating crayons that can be purchased at Stock and Station Agents. Bucks are fitted with a harness that holds a coloured crayon over the breast bone. When a buck mates a coloured mark is left on the rump of the doe.

It is essential that the harnesses are correctly fitted. If harnesses become loose they will entangle the legs and prevent mounting. Inspect harnesses frequently and make adjustments before the proper mating period begins.

Records can be kept of when does are mated. By changing the colours of the crayons every 21 days it is easy to determine when does have conceived. Do not separate does that have been marked from the mating flock. Some does need to be mated several times before they conceive. Information recorded from the date of crayon marking can be used to better manage the kidding process.

The previous version of this note was published in May 2002.

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